Deploying Tungsten Fabric on Kubernetes via Helm

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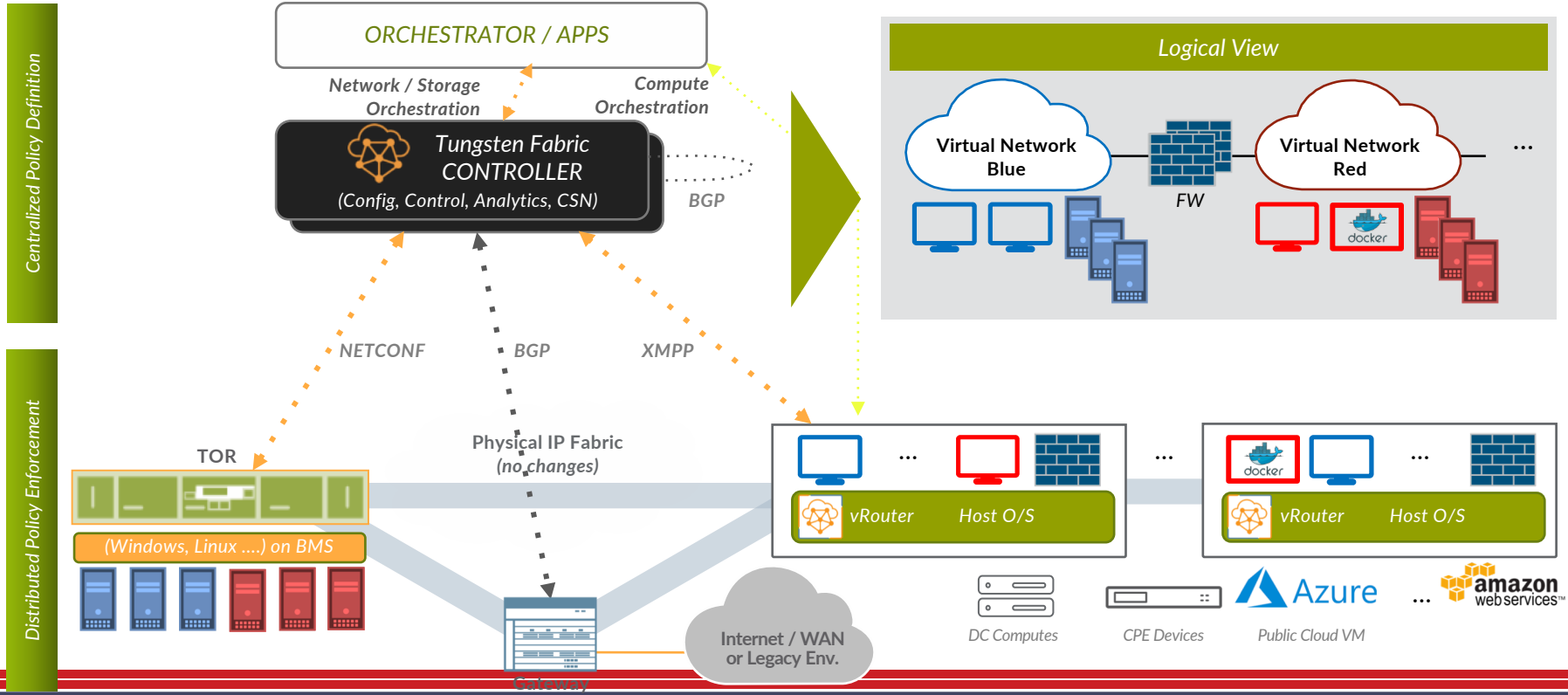
tungstenfabric

Agenda

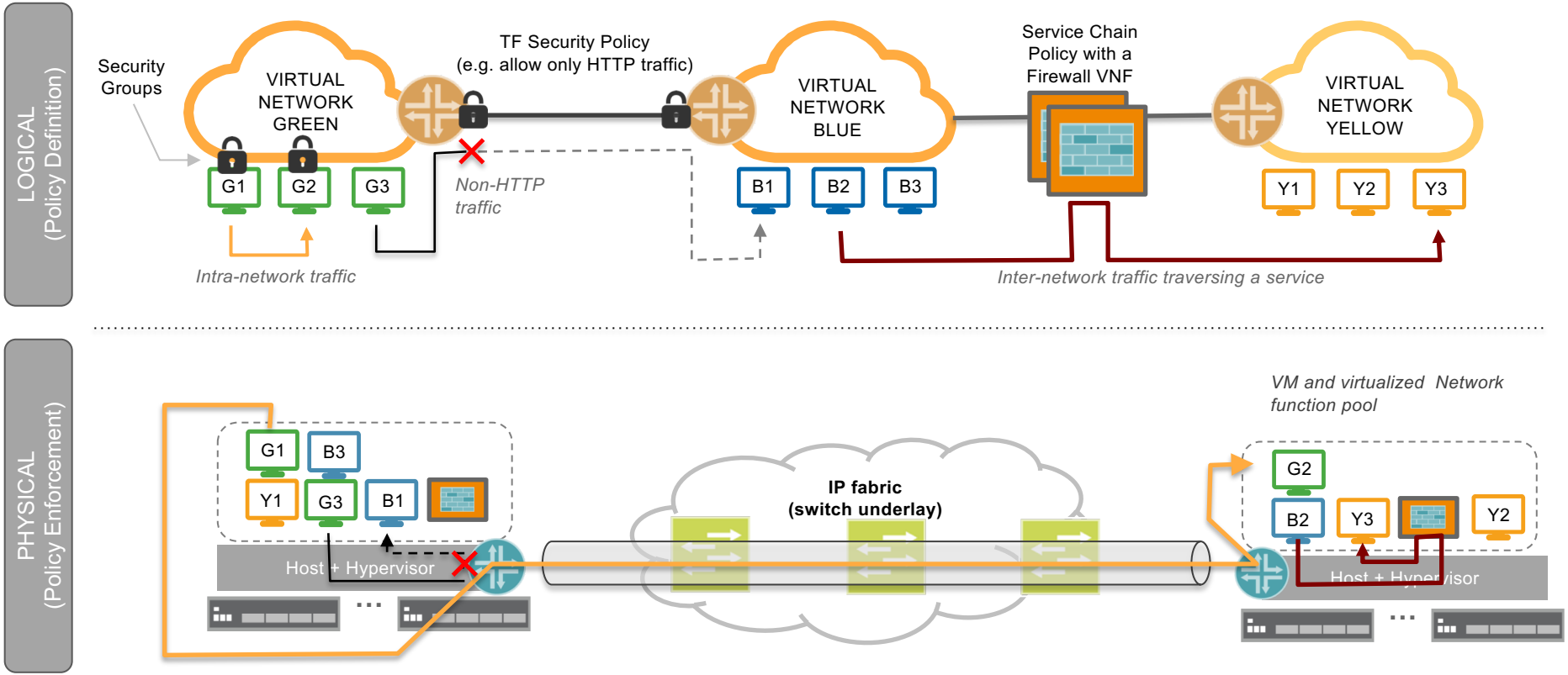
- Tungsten Fabric Architecture Overview
- Tungsten Fabric Kubernetes Support
- What is IBM Cloud Private (ICP)?
- Tungsten Fabric/Contrail integration with ICP
- Demo – Deploying Tungsten Fabric on K8s via HELM

HELM

Architecture Overview



Visualizing Tungsten Fabric's Operational Effects



Tungsten Fabric Kubernetes Support

Tungsten Fabric Integration with k8s

** Contrail-Kube-manager listens to K8s API Server and conveys the API request to Contrail Controller*

kubectl
(user commands)

Namespace: kube-system

API Server | Controller/Replication Manager | etcd

Scheduler | Discovery | Dashboard | …

Contrail-kube-mgr

Contrail Controller

Contrail Analytics

POD 1

POD 2

POD 3

POD 4

Kubelet

CNI Plugin

vRouter
(replaces kube-proxy)

Compute Node-01

Kubelet

CNI Plugin

vRouter
(replaces kube-proxy)

Compute Node-02

Tungsten Fabric Evolution to Microservices

- Contrail-Control (5 daemons)
- Contrail-Config (8 daemons)
- Contrail-Analytics (5 daemons)
- Contrail-WebUI (4 daemons)
- Contrail-DB (3 daemons)
- Contrail-vRouter (3 D) + Kernel/DPDK (FP)

Contrail Controller: 2n+1

OR

BMS

Contrail 1.X/2.X/3.X BMS or VMs base (SDN Controller)

Multiple Process running in one Container (FAT Containers)

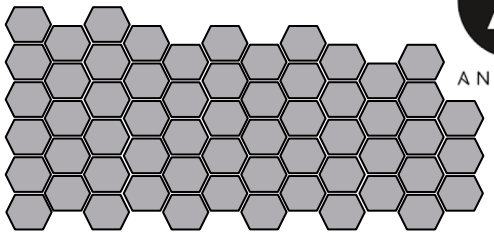
Analytics DB | Config + Control | Analytics

Kube MGR | HA Proxy | vRouter Agent

Contrail 4.X (Containers) BMS or VMs base (SDN Controller)

DaemonSet, Ingress Services with Host Networking
with choice of run single or multiple containers per PODs

27-30 Containers Images

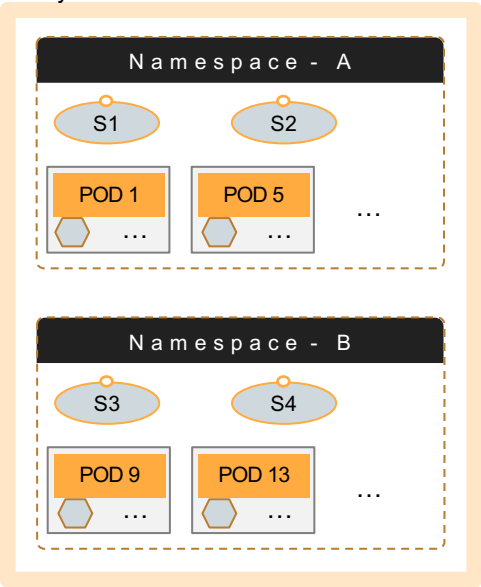


Contrail 5.X (Containers) Microservices (SDN Controller)

Levels of Isolation - Multitenancy

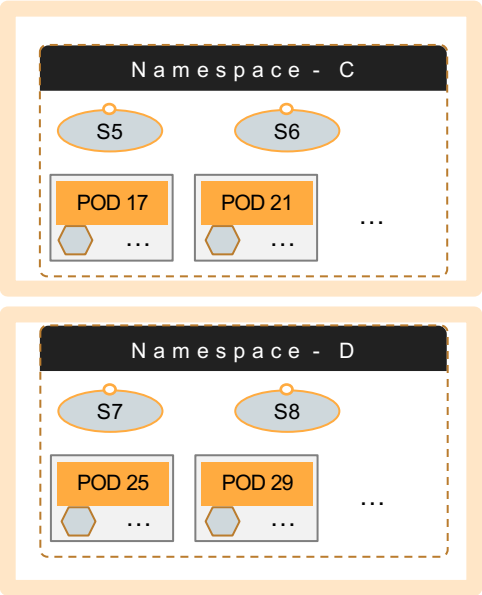
DEFAULT CLUSTER MODE

- This is how Kubernetes networking works today
- Flat subnet where -- Any workload can talk to any other workload



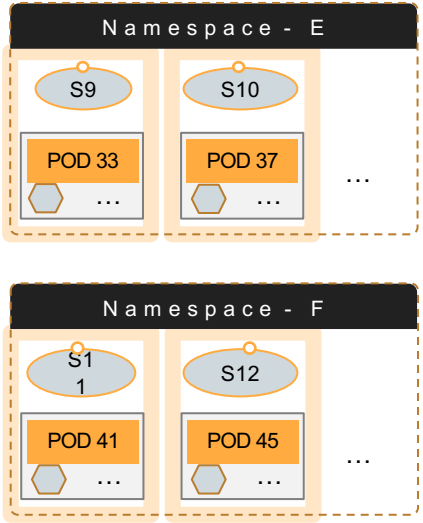
NAMESPACE ISOLATION

- In addition to default cluster, operator can add isolation to different namespaces transparent to the developer

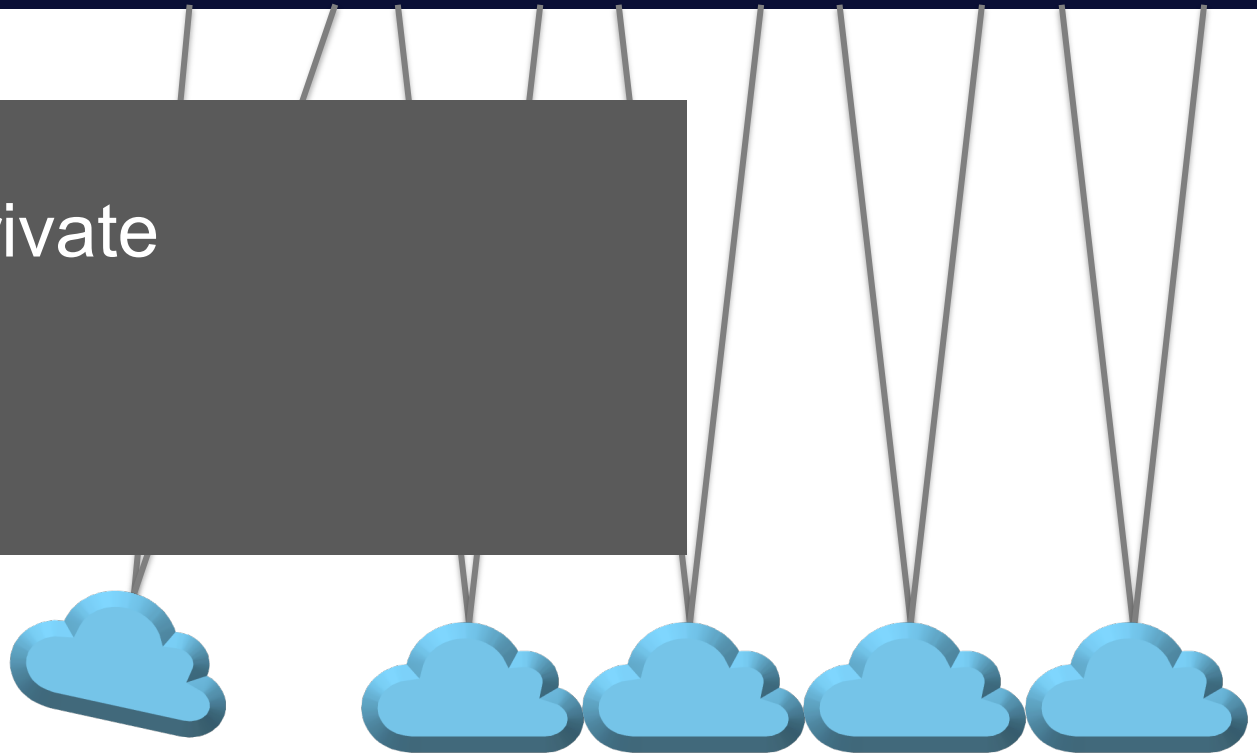


POD / SERVICE ISOLATION

- In this mode, each POD is isolated from one another
- Note that all three modes can co-exist

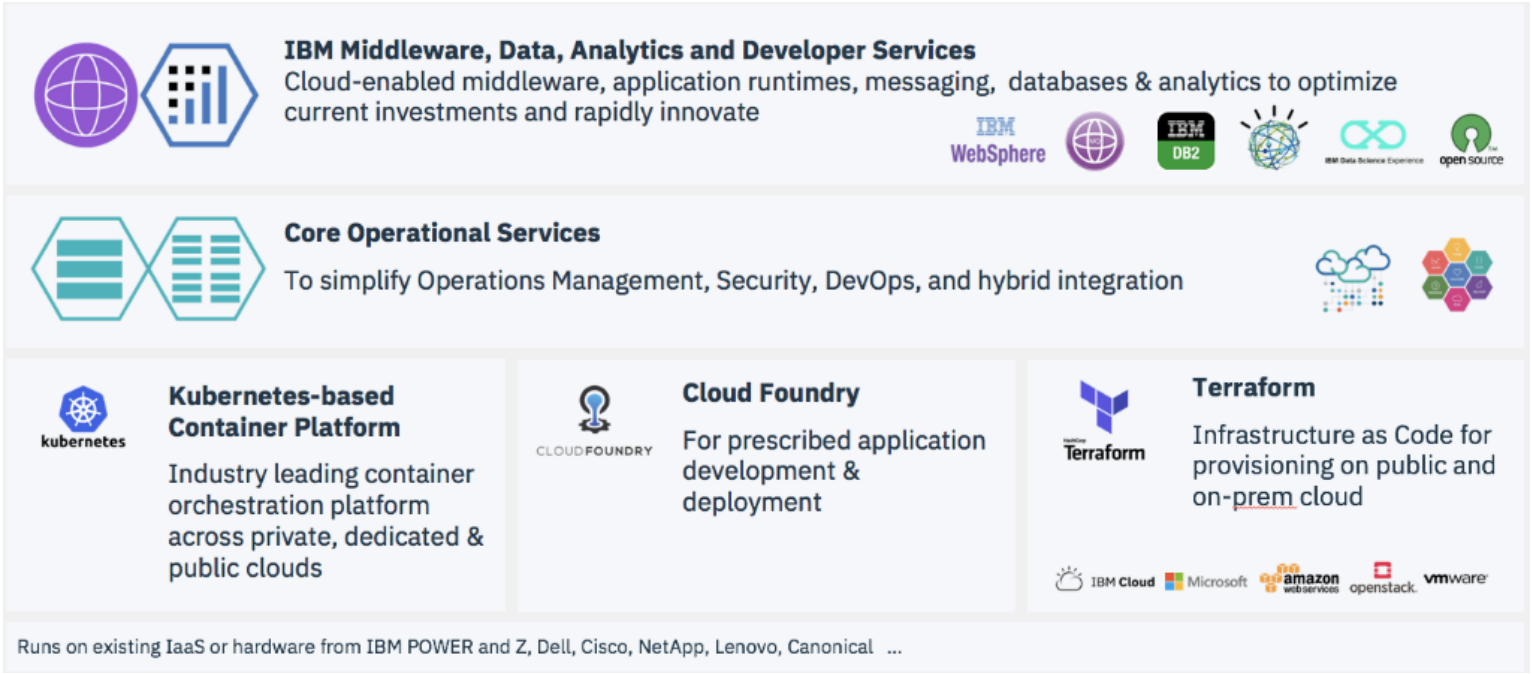


IBM Cloud Private

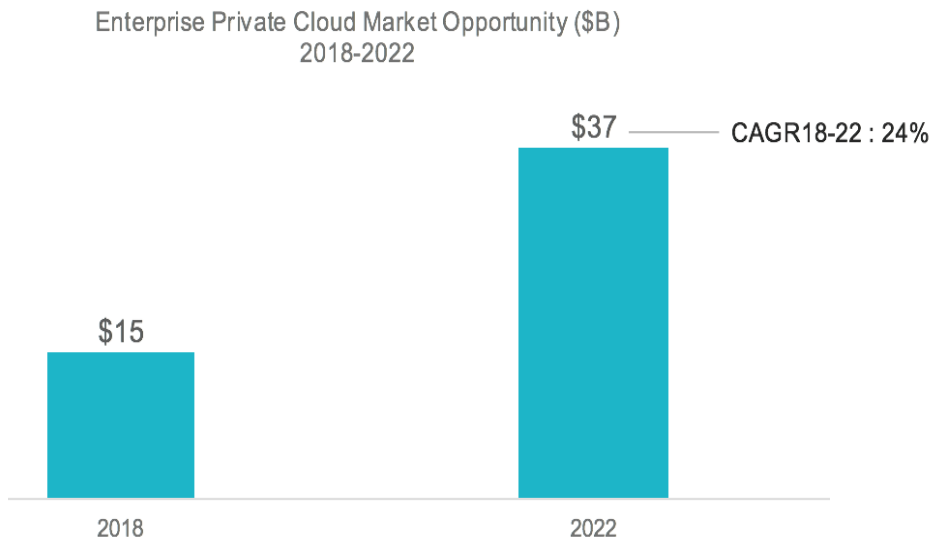


IBM Cloud Private (ICP)

Platform to develop **modern applications** based on **micro-services architectures** behind the enterprise's firewall while **consuming** IBM's catalog of **middleware and software**



Private Cloud Market is Growing
Compliance, security, support and services



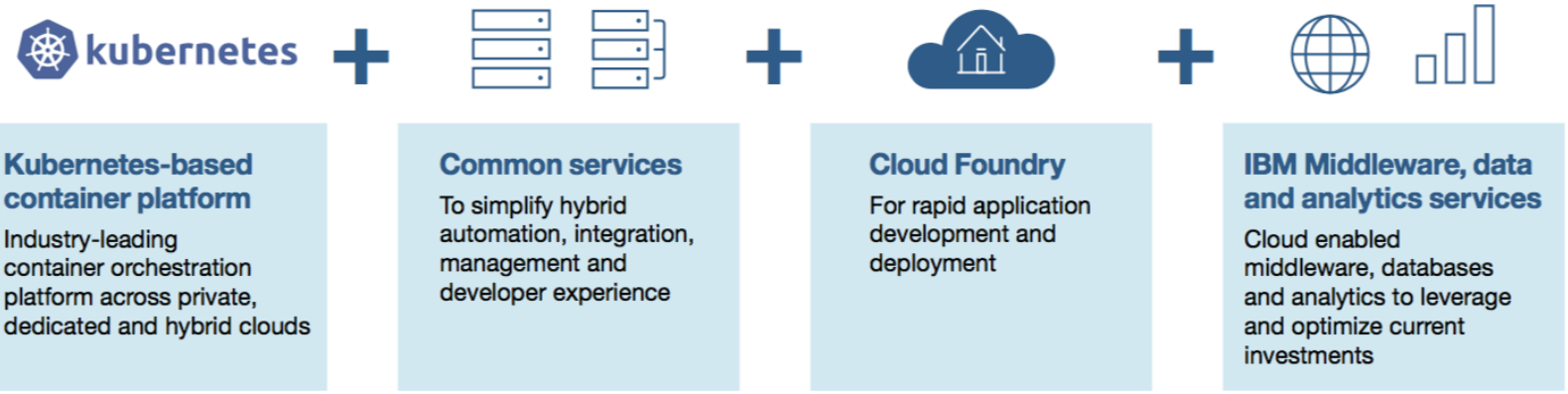
Sources: IBM Market Development and Insights

- **Private Cloud** adoption is **growing** as enterprises are concerned about **compliance**, **security**, **support** and **services**
- Enterprises are starting to modernize its **core applications** as **Cloud Native** leveraging a micro-services architecture and cloud services
- **Private Cloud** is a step towards achieving a **Hybrid** and **Multi Cloud implementation** standardizing the **DevOps**

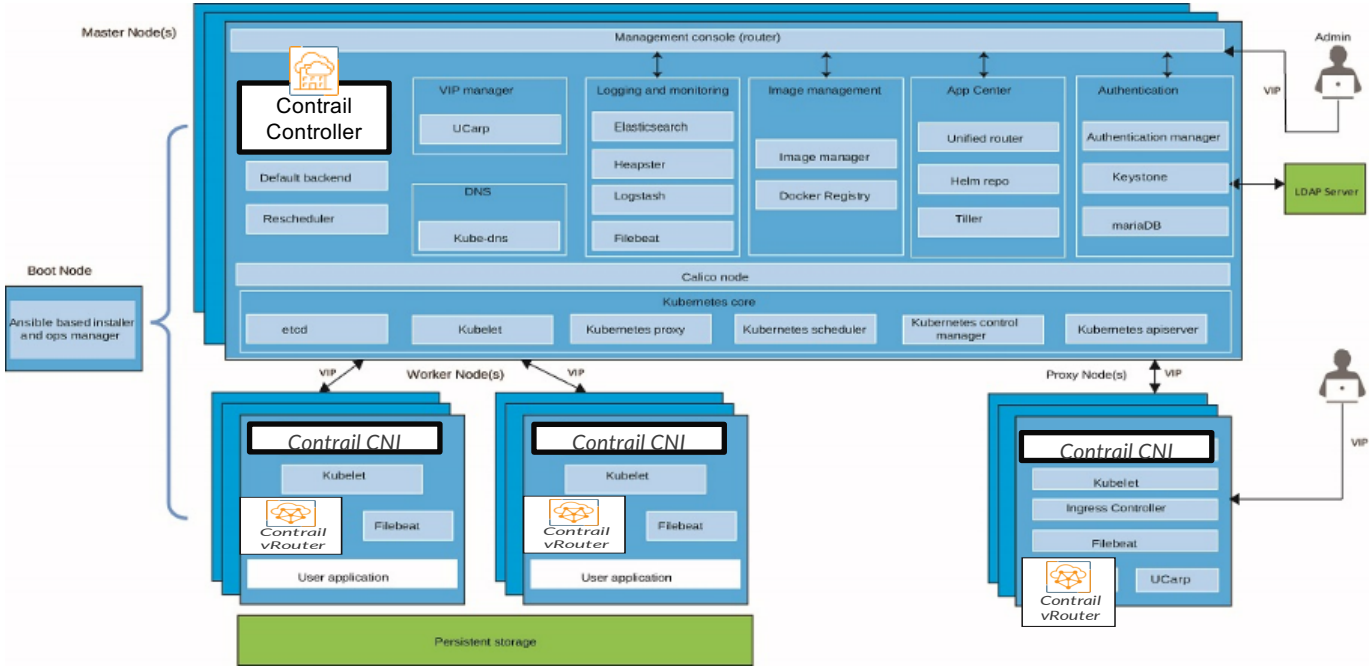
IBM Cloud Private
(ICP) and Contrail

IBM Cloud Private (ICP)

IBM Cloud Private is a **platform** to develop **modern applications** based on **micro-services architectures** behind the enterprise's firewall while **consuming** IBM's catalog of **middleware and software**



IBM Cloud Private (ICP) and CONTRAIL



Boot Node: Used for running Only one boot node is required for any cluster.

Master Node: Provides management services and controls the worker nodes in a cluster.

Worker Node: Provides a containerized environment for running tasks.

Proxy Node: Transmits external request to the services created inside your cluster.

Optional Nodes: Management, Vulnerability Advisor (VA), etcd. …

ICP bring up

Step: 1

Physical Infra

- Install OS on all the host and setup environment
- Install ICP essential software on all the nodes
- Docker
- Go api
- Git
- Kubernetes
- Helm (on host network)
- Bring up CNI via HELM

Step: 2

Platform/Tools/Config

- Maria DB
- AWS S3
- Authentication
- Analytics
- Log Stash
- ELK stash
- RDBMS
- Identity and access
- Metering
- Etc…

Step: 3

Services

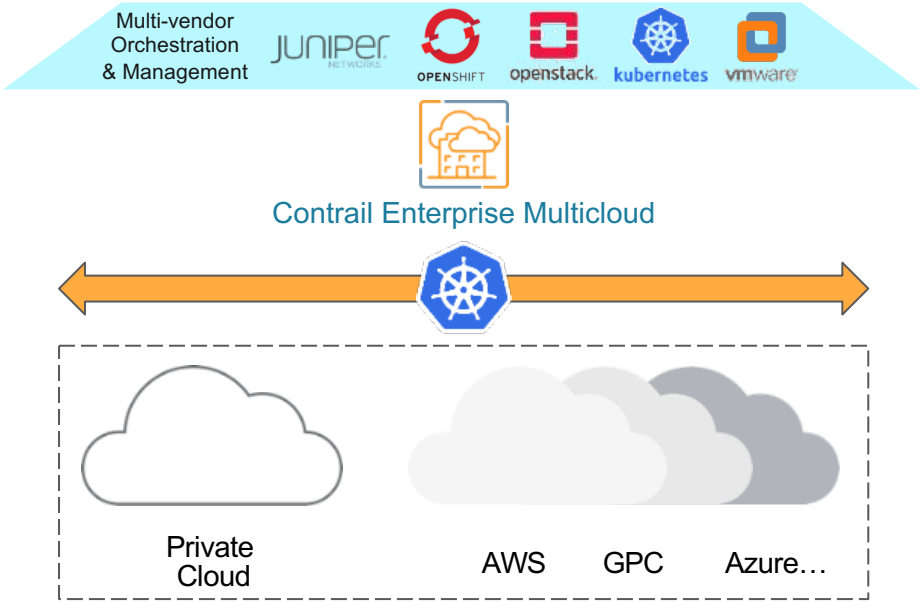
- Customer applications
- VNF's
- HRC
- Banking applications etc

Nodes

Role	CPU	RAM	Disk	OS
Master	24	64	500	RedHat7.5
Proxy	24	64	256	RedHat7.5
Compute1	24	64	256	RedHat7.5
Compute2	24	64	256	RedHat7.5

Role	IP	GW		
Master	10.11.10.90	10.11.10.254		
Proxy	10.11.10.91	10.11.10.254		
Compute1	10.11.10.92	10.11.10.254		
Compute2	10.11.10.93	10.11.10.254		

Use Case: Kubernetes Security and Networking



Implement Kubernetes

- Control and security for Kubernetes is particularly painful
- Isolate K8s Pods/containers to provide segmentation and security
- Enhance K8s networking service to provide high performance connectivity
- Apply and re-use policies from any environments including K8s
- Support multiple K8s deployment types - K8s on BMS, OpenStack, Public Clouds

One platform to connect, secure, and monitor Kubernetes environment

IBM Cloud Private Competitor Landscape

	IBM Cloud Private	IBM Cloud Private	IBM Cloud Private
SDN	Project Calico		NSX
INFRASTRUCUTRE	Linux, VMware, openstack, NUTANIX, IBM z Systems, Power Systems	Linux, BMS, VMware, openstack, NUTANIX, IBM z Systems, Power Systems VTEP through QFX	VMware

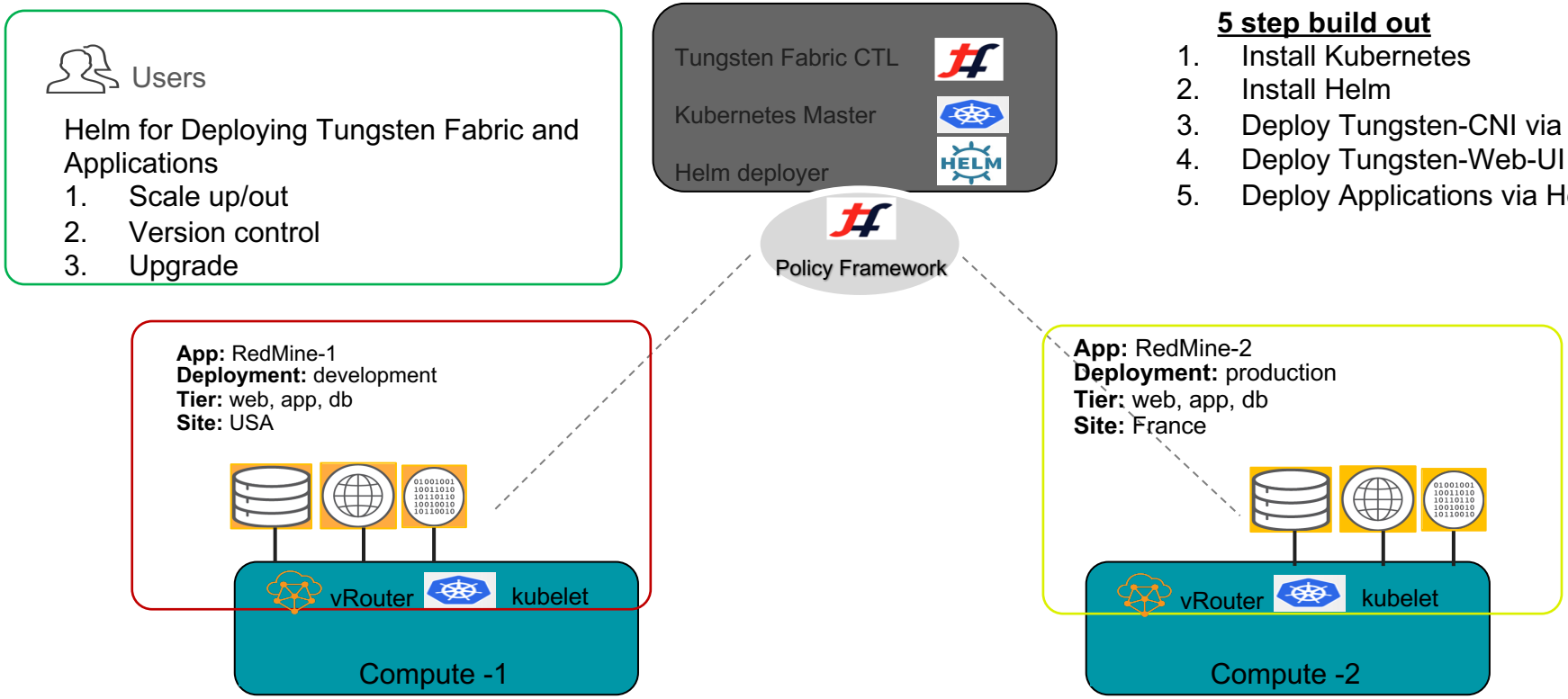
IBM Cloud Private Landscape

	Project Calico	Contrail / tungstenfabric
Open Source	*Project CALICO*	tungstenfabric
Multitenancy	*Packet filters implemented in Linux bridges*	*Each tenant has its own VRF*
DDI Services	*Only DHCP on OpenStack*	*Fully supported*
Security Policies	*Packet filters implemented in Linux bridges*	*Supports Network Policy enforcement extending the label based firewall policy to OpenStack, VMWare, and Bare Metal*
Analytics		*RT visibility, alerts and overlay/underlay correlation*
Service Chaining		*NG-FW with vSRX*
Fabric Management		*Data Center and Gateways*
UI		*Contrail Command*
Bare Metal support		*Contrail*

Deploying Tungsten Fabric on K8s via HELM

Demo

Topology


Users
Helm for Deploying Tungsten Fabric and Applications
1. Scale up/out
2. Version control
3. Upgrade
Tungsten Fabric CTL
Kubernetes Master
Helm deployer
HELM
Policy Framework
5 step build out
1. Install Kubernetes
2. Install Helm
3. Deploy Tungsten-CNI via Helm
4. Deploy Tungsten-Web-UI via Helm
5. Deploy Applications via Helm
App: RedMine-1
Deployment: development
Tier: web, app, db
Site: USA
vRouter
kubelet
Compute -1
App: RedMine-2
Deployment: production
Tier: web, app, db
Site: France
vRouter
kubelet
Compute -2

Try Tungsten Fabric

https://tungstenfabric.github.io/website/Tungsten-Fabric-15-minute-deployment-with-k8s-on-AWS.html

Thank You

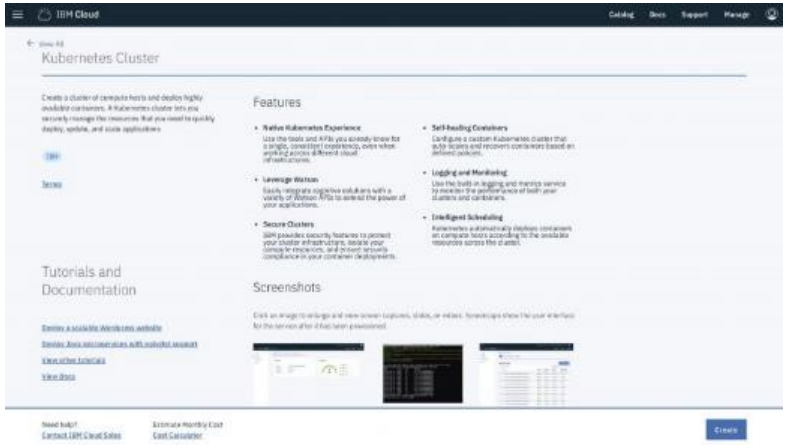
IBM Cloud Private and Kubernetes Service

IBM Cloud Kubernetes Service

Public Private

IBM Cloud Private

Managed Kubernetes Service from IBM Cloud



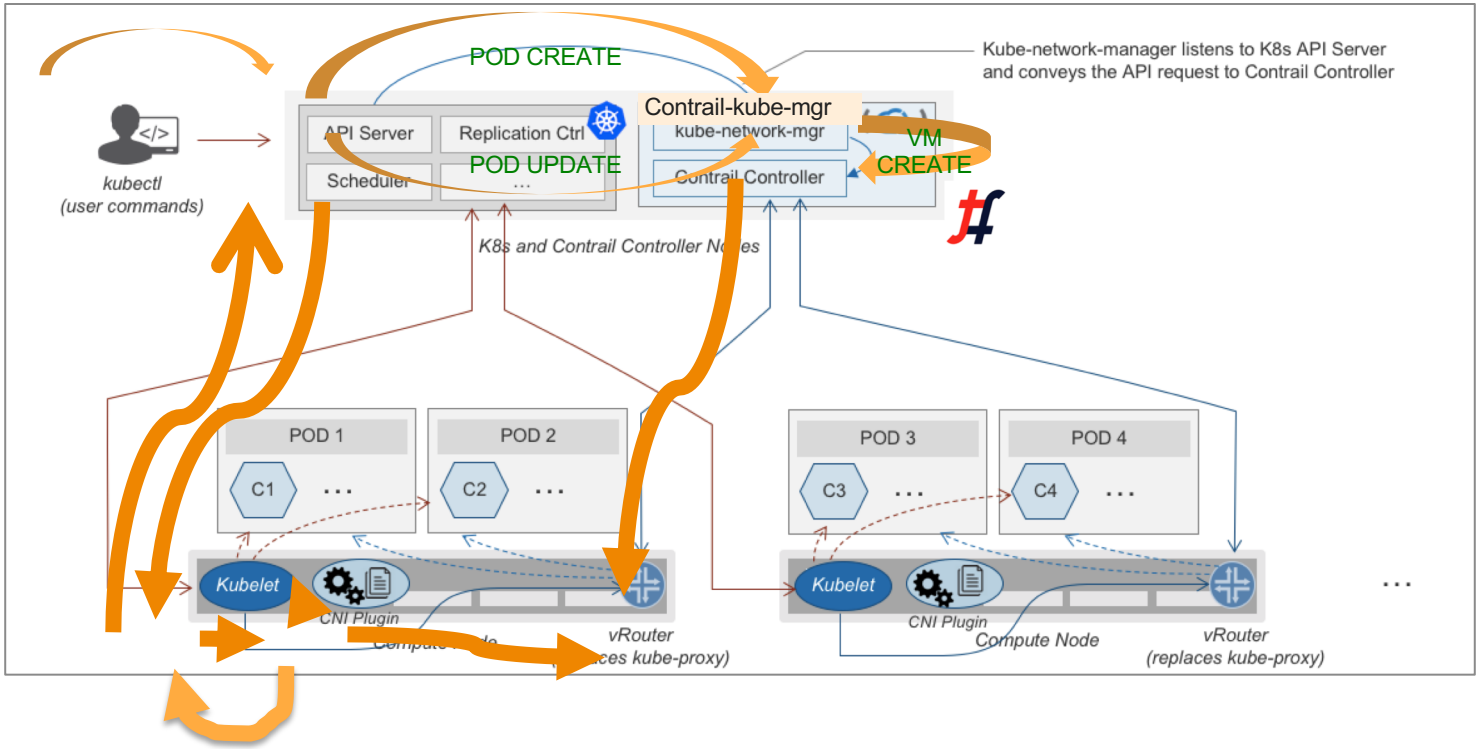
Application platform to build, deploy and manage cloud native applications on-premises

IBM Middleware, Data, Analytics and Developer Services
Cloud enabled middleware, application runtimes, messaging, databases & analytics to optimize current investments and rapidly innovate

Core Operational Services
To simplify Operations Management, Security, DevOps, and hybrid integration

Kubernetes-based Container Platform
Industry leading container orchestration platform across private, dedicated & public clouds

Cloud Foundry
For prescribed application development & deployment

Runs on existing IaaS: VMware, OpenStack, Power, LinuxOne, …

Pod Creation